SURFACING OF SUBSYSTEM POWER CONSUMPTION ON AN AGRICULTURAL MACHINE

FIELD OF THE DESCRIPTION

[0001] The present disclosure relates to agricultural equipment. More particularly, the present disclosure relates to monitoring power consumption by subsystems of a piece of agricultural equipment.

BACKGROUND

[0002] There are a wide variety of different types of agricultural machines in use. Some agricultural machines are used for harvesting, planting, tillage, spraying or other operations.

[0003] By way of example, harvesting equipment can include equipment that harvests grain. Harvesting grain is a very power-intensive process. In fact, in some conditions, the harvesting capacity of a machine is limited by available machine power.

[0004] Such harvesting machines often have multiple different subsystems that are operational simultaneously. The power used in the harvesting operation can be affected by machine settings for the various subsystems. An operator can often make adjustments to various subsystems in order to modify the operation of those subsystems, or to modify the operation of the harvester as a whole. Modification of the operation of a subsystem can also change the power consumed by that subsystem.

[0005] The discussion above is merely provided for general background information and is not intended to be used as an aid in determining the scope of the claimed subject matter.

SUMMARY

[0006] Power consumption is sensed for individual subsystems of an agricultural machine. Visual indicia are generated, that are indicative of the sensed power consumption, for each individual subsystem. A user interface mechanism is controlled to display the visual indicia, indicating power consumption of the individual subsystems on the harvesting machine.

[0007] This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter. The claimed subject matter is not limited to implementations that solve any or all disadvantages noted in the background.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a block diagram of one example of an agricultural mobile machine.

[0009] FIG. 2 is a block diagram showing an example in which the agricultural mobile machine is a combine.

[0010] FIGS. 3A and 3B (collectively referred to herein as FIG. 3) show a flow diagram illustrating one example of the operation of the agricultural mobile machine in surfacing power consumption data for subsystems.

[0011] FIGS. 4-6 show different examples of visual indicia that can be generated to indicate power consumption of subsystems of an agricultural machine.

[0012] FIGS. 7-9 show examples of mobile devices, on which the power consumption data can be surfaced.

[0013] FIG. 10 is a block diagram of one example of a computing environment that can be used in the architectures shown in the previous figures.

DETAILED DESCRIPTION

[0014] FIG. 1 is a block diagram of one example of an agricultural mobile machine 100. In the example shown in FIG. 1, machine 100 illustratively includes a set of controlled subsystems 102-104, one or more processors or servers 106, and a power consumption surfacing system 108. Machine 100 can also include control system 110, user interface system 112, communication component 114, and it can include other items 116. FIG. 1 shows that machine 100 can communicate with one or more remote systems 118 and can be controlled by an operator 120. In one example, user interface system 112 illustratively includes a set of output mechanisms 122 and a set of input mechanisms 124. Output mechanisms 122 illustratively output data or other information to operator 120. They can include a wide variety of different types of mechanisms, such as different types of display devices, audio devices, haptic devices, etc.

[0015] Input mechanisms 124 illustratively include a set of input mechanisms that operator 120 can use to provide inputs for controlling and manipulating agricultural mobile machine 100. The input mechanisms 124 can include settings input mechanisms that can be used to set operator adjustable settings on machine 100. They can also include a wide variety of other input mechanisms, such as a steering wheel, foot pedals, levers, buttons, keypads, joysticks, etc. In addition, they can include user actuable icons or links or other controls on a user interface display. These and additional examples of output mechanisms 122 and input mechanisms 124 are described in greater detail below. Operator 120 provides inputs to the control system 110 and to other machine functionality 116 in order to control the operation and functioning of agricultural mobile machine 100.

[0016] In the example shown in FIG. 1, each of the controlled subsystems 102-104 is controllable by operator 120. Each subsystem includes a power detector 126-128, and other subsystem functionality 130-132. The power detectors 126-128 illustratively detect power consumed by the corresponding individual, controlled subsystem 102-104. The other subsystem functionality 130-132 illustratively performs functions corresponding to that particular subsystem. For instance, where the machine is a combine and a subsystem is a threshing subsystem, the other subsystem functionality may include functionality for the threshing concave and rotor, as well as functionality for controlling the concave clearance, rotor speed, etc. Where the subsystem is the cleaning subsystem, the other functionality may include the cleaning fan, chaffer and sieve, and the functionality for controlling the fan speed, and the chaffer and sieve openings. These are examples only.

[0017] The power detectors 126-128 are thus configured to detect power consumed by the individual subsystems. Therefore, those detectors may vary with the particular subsystem for which they are detecting power consumption. They provide output signals to power consumption surfacing system 108 which illustratively includes consumption analy-